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EP 0314535 A1

EP 0304644 A2

EP 0249924 A1

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US 4608047 A

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(54) Sanitary napkin

(57) The napkin has flaps 20 extending from opposite sides of a central absorbent portion which comprises a liquid impermeable backsheet 2, an absorber 3 and a liquid permeable topsheet 1. The flaps are composed of film having a base weight of 30 to 90 g/m<sup>2</sup> and comprising material having a resin density of 0.910 to 0.940 g/cm<sup>3</sup>, particularly a polyolefin or olefin copolymer. The flaps carry adhesive layers 5 and may be embossed to provide protuberances 6.

## FIG.2

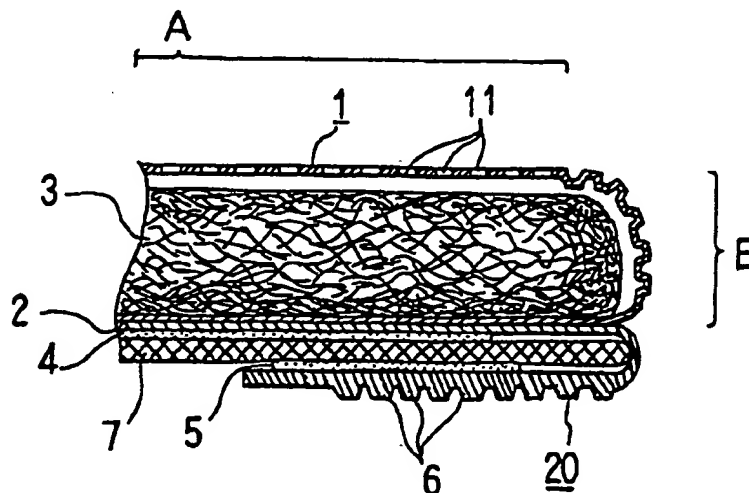


FIG.1

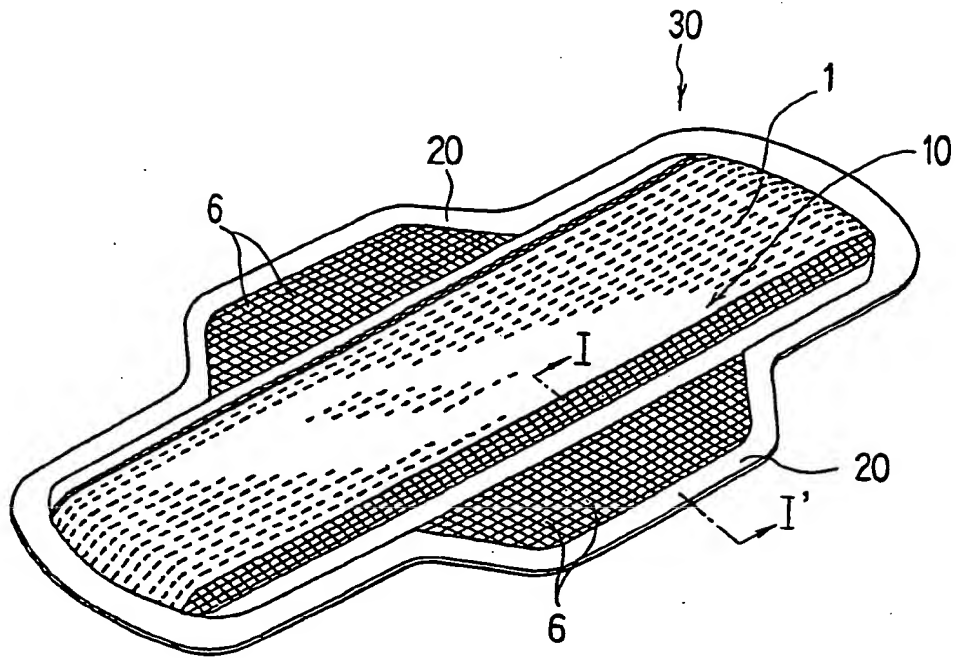
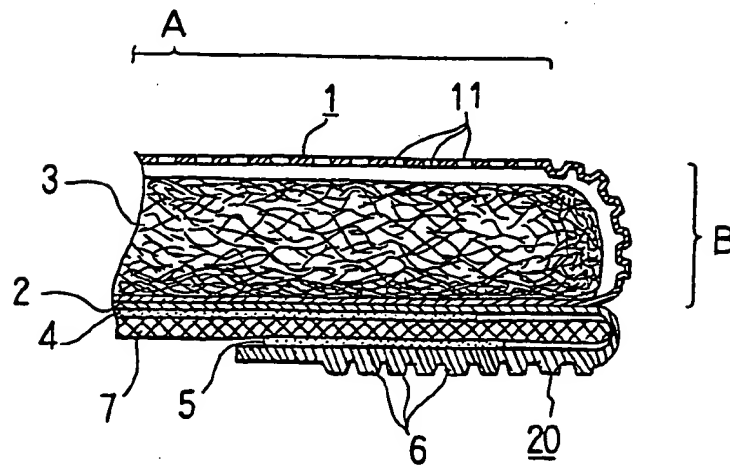


FIG.2



## SANITARY NAPKIN

## BACKGROUND OF THE INVENTION

## [Field of the Invention]

This invention relates to a sanitary napkin which is well-fitted and comfortable to wear.

## [Description of the Prior Art]

A sanitary napkin having side flaps (flaps) has such a function that the napkin can be stably fixed to a crotch portion of shorts by side flaps thereof. The sanitary napkin of this type is more effective in preventing the shorts from getting dirt compared with a sanitary napkin which does not have the side flaps. Aside from the question as to whether the above effect is actually obtainable, the sanitary napkin having the side flaps are considered to have a capability of giving such a psychological easiness to its wearer as the above effect being actually assured.

As typical publications describing a sanitary napkin having side flaps, there can be listed Japanese Laid-Open Patent Application No. Sho 60-75058, Japanese Laid-Open Patent Application No. Sho 64-70050, etc. The flaps of the conventional sanitary napkins described in these publications are formed by combining the backsheet and the topsheet together.

However, the above conventional sanitary napkins had

the following shortcomings 1) to 3).

1) Waste materials sometimes enter between the topsheet and the backsheet to cause a leakage.

2) Since the flap portions are low in strength, they are readily expanded and/or torn when in use.

3) Since the flaps are thin, sounds are easy to occur due to friction produced during the time the sanitary napkin is put on.

That is, the conventional napkins provided with flaps are still insufficient in preventiveness of liquid leakage, and not well-fitted nor comfortable to wear.

#### SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a sanitary napkin, which is sufficient in preventiveness of liquid leakage, sufficient in strength of the flaps, well-fitted and comfortable to wear.

As a result of hard study, the inventors of the present invention have found that the above object can be achieved by a sanitary napkin having flaps composed of film of a particular basis weight formed from a resin material of a particular density.

The present invention has been made based on the above finding. According to the present invention, there is provided a sanitary napkin having flaps extending from opposite side portions of a central absorbent portion, the

central absorbent portion comprising a liquid impermeable backsheet, an absorber and a liquid permeable topsheet, the flaps being composed of film having a basis weight of 30 to 90 g/m<sup>2</sup> which is composed of material having a resin density of 0.910 to 0.940 g/cm<sup>3</sup>.

In the sanitary napkin of the present invention, the central absorbent portion is fixed to a predetermined position of an inner surface of a crotch portion of shorts, the flaps are folded in such a manner as to sandwich the shorts, and then the flaps are fixed to an outer surface of the crotch portion of the shorts for wearing.

The sanitary napkin of the present invention is sufficient in preventiveness of liquid leakage, sufficient in strength of the flap portions, well-fitted and comfortable to wear. The sanitary napkin according to the embodiment of the present invention specifically exhibits the following effect.

Since the resin density of the film material forming the backsheet and flaps is in a predetermined range, the flap strength is increased, the stiffness, as well as the feel and outlook, is appropriate and the transportation is easy during the process of manufacture. Further, the sanitary napkin of the present invention is easy to wear because it provides an apparent feeling as having a heavy volume of the backsheet and flaps. Moreover, frictional

sounds, if any, produced during the time the sanitary napkin is put on are small, a possible displacement can be prevented by frictional force of the flap portions, and the waste materials are prohibited from flowing.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing a sanitary napkin according to one embodiment of the present invention; and

Fig. 2 is a cross-sectional view taken on line I-I of the sanitary napkin of Fig. 1, this sanitary napkin being attached to shorts.

#### DETAILED DESCRIPTION OF THE EMBODIMENT

One embodiment of a sanitary napkin of the present invention will be described in detail with reference to the accompanying drawings. Also, the present invention will be specifically described by way of test examples. It is noted however that the present invention is not limited to them.

As shown in Figs. 1 and 2, the sanitary napkin 30 according to this embodiment has flaps 20 extending from opposite side portions of a central absorbent portion 10 which comprises a liquid impermeable backsheet 2, an absorber 3 and a liquid permeable topsheet 1. The flaps 20 is composed of a film having a basis weight of 30 to 90 g/m<sup>2</sup> which is formed from a material having a resin densi-

ty of 0.919 to 0.940 g/cm<sup>3</sup>.

More specifically, as shown in Figs. 1 and 2, the central absorbent portion 10 in the sanitary napkin 30 of this embodiment is formed by wrapping the absorber 3 with the topsheet 1, and adhering the topsheet 1 and the backsheet 2 together by adhesive agent applied to the surfaces of contact thereof. Here, a plurality of openings 11 are formed in a central area A of the topsheet 1 so that liquid can permeate therethrough. Side edge areas B of the topsheet 1 are liquid impermeable so that no liquid leakage may occur. The rate of opening area (or hole area) of the openings 11 is determined in view of liquid permeability and liquid return preventiveness. If the rate of opening area is too small, the liquid permeability is substantially poor. As the rate of opening area is increased, the sheet formability is proportionally lowered. Therefore, taking this into consideration, the rate of opening area is preferably in a range of from 10 pc/cm<sup>2</sup> to 100 pc/cm<sup>2</sup> and more preferably in a range from 30 pc/cm<sup>2</sup> to 60 pc/cm<sup>2</sup>.

An adhesive layer 4 is provided on that portion of a lower surface of the backsheet 2 which is placed opposite to the central absorbent portion 10. A peelable sheet (not shown) is adhered to the surface of the adhesive layer 4.

The flaps 20 are formed by expanding the backsheet 2 outwardly at generally longitudinally central areas from opposite side edge portions of the central absorbent portion 10. The flaps 20 are each provided at lower surfaces thereof with an adhesive layer 5, and a peelable sheet (not shown) is adhered to the surface of the adhesive layer 5.

The backsheet 2 and the flaps 20 are provided with concavities-and-convexities 6 (concavities and convexities of the backsheet 2 are not shown) by embossing the surfaces thereof, so that wearability and outer appearance are characteristic. By embossing, there can be formed various patterns such as, linear line, turtleback, mesh, pin point and the like. The convexities-and-concavities 6 formed, for example, by the pin point pattern are preferably from 0.05 to 1 mm in height and from 10 to 100 pc/cm<sup>2</sup> in density.

The materials for making the backsheet 2 and flaps 20, the topsheet 1, and the absorber 3 which are used for the sanitary napkin 30 of the present invention are not particularly limited but may be those used for normal sanitary napkins. Specifically, the following materials, etc. are used.

Examples of the materials for the backsheet 2 and flaps 20 include a hydrophobic thermoplastic resin such as



polyolefin, copolymer of olefin and other vinyl monomers such as acrylic ester and vinyl acetate, polyester and polyamide, or polymer-blended series, etc. Among them, the hydrophobic thermoplastic resin sheet such as polyolefin, a copolymer of olefin and other monomers, or polymer-blended series is preferably used in view of its feel, outlook, and handling. One of them may be used alone, or two or more of them may be mixed together for use. A film obtained by forming the hydrophobic thermoplastic resin into a sheet or the like can be used as the backsheet 2 and flaps 20. Furthermore, an inorganic filler such as  $\text{TiO}_2$ , talc or the like is attached to the inner side of the hydrophobic thermoplastic resin in order to provide a covering ability and limiting stickiness of the surface of such obtained film. A film composed of a laminated sheet which is formed by using two or more of the above-mentioned sheets can be particularly preferably used as the backsheet 2 and flaps 20 of the present invention.

The topsheet 1 may use the same material as the backsheet 2 and flaps 20. In case a liquid impermeable sheet composed of the hydrophobic thermoplastic resin or the like is used as the topsheet 1, the topsheet 1 is composed of an apertured plastic film having the openings at the central area A (skin-contacting area) as previously

mentioned.

The absorber 3 is preferably composed chiefly of a comminuted wooden pulp, and also of a high absorption polymer. Besides the above, a mixture of thermoplastic resin, cellulose fiber, and high absorption polymer subjected to heat treatment is preferable. The high absorption polymer may be mixed with pulp. The high absorption polymer is preferably in a granular state having a water absorption ability capable of absorbing and holding liquid more than twenty times its dead weight and gelled when it absorbs water. Such high absorption polymer preferably includes starch-acrylic acid (salt) graft copolymer, graft copolymer, saponified starch-acrylonitrile copolymer, crosslinked polymer of sodium carboxymethyl-cellulose, acrylic acid (salt) polymer or the like.

The characteristic part of this embodiment will now be described. In the sanitary napkin 30 of this embodiment, the flaps 20 are composed of film of a basis weight of 30 to 90 g/m<sup>2</sup> and preferably of 40 to 80 g/m<sup>2</sup> which is composed of a material, among the above-mentioned materials, of a resin density of 0.910 to 0.940 g/cm<sup>3</sup>.

If the resin density of the material is less than 0.910 g/cm<sup>3</sup>, the flaps are low in strength and readily expanded and/or torn when the sanitary napkin is put on or attached. On the contrary, if the resin density of the

material exceeds  $0.940 \text{ g/cm}^3$ , a feeling of uneasiness such as a feeling of stiffness is given when the sanitary napkin is put on or attached and the flaps are difficult to be folded because of rigidity. Moreover, the sanitary napkin becomes easy to escape from the shorts.

If the basis weight is less than  $30 \text{ g/m}^2$ , an unreliable feeling is given when the sanitary napkin is put on or attached. Moreover, since the strength is low, the flaps are readily expanded when the sanitary napkin is fixed to the shorts or when the sanitary napkin is put on. If the basis weight exceeds  $90 \text{ g/m}^2$ , a feeling of stiffness is given when the sanitary napkin is put on or attached. Also, since the rigidity of the flaps is high, the flaps are difficult to be folded and readily escaped from the shorts.

In case the flaps 20 are composed of film which is composed of a mixture of two or more different kinds of materials, the materials are all preferably in the range of the above-mentioned resin density. However, inasmuch as the resin density of the mixture is in the above-mentioned range, the resin density of each material may be outside of the above-mentioned range. Also in case the flaps are formed by expanding the backsheet and the top-sheet and superimposing the two sheets, the basis weight and resin density of the two sheets may be outside of the

above-mentioned range inasmuch as the basis weight and resin density of the flaps which are formed of the two sheets are in the above-mentioned range, the basis weight and resin density of the flaps which are formed by the two sheets, may be outside of the above-mentioned range inasmuch as the resin density is in the above-mentioned range.

Since the sanitary napkin 30 of this embodiment has the above-mentioned construction and particularly has the above-mentioned features, the following effects (1) to (4) are exhibited.

(1) Since the backsheet and the flaps are embossed to form convexities and concavities on their surfaces, the feeling of contact is excellent and the outer appearance is characteristic.

(2) Since there is an apparent feeling as having an appropriate amount of volume as the backsheet, the sanitary napkin is easy to wear, the frictional sounds, if any, produced during the time the sanitary napkin is put on are small, and there is no uneasy feeling about its fittingness or wearability because the thickness and flexibility are similar to those of an undergarment.

(3) Since the backsheet is provided with concavities and convexities because of emboss treatment applied thereto, the displacement is prevented by frictional force of the film and the flow of the waste materials is prohibit-

ed.

(4) Since the resin density of the film material forming the backsheet and flaps is in a predetermined range, the flap strength is increased, the stiffness, as well as the feel and outlook, is appropriate and the transportation is easy during the process of manufacture.

In order to use the sanitary napkin 30 of this embodiment, as shown in Fig. 2, after the peelable tape is peeled off, the adhesive layer 4 of the backsheet 2 is adhered to the skin-contacting area of the shorts 7 and the flap portion 20 is folded along the thickness of the crotch portion of the shorts 7 and then the adhesive layer 5 on the rear surface of the flap portion 20 is fixedly adhered to the surface of the shorts 7.

The sanitary napkin of the present invention is not limited to the above-mentioned embodiment. For example, in this embodiment, although the backsheet and the flaps are integrally formed together, the backsheet and the flaps may be formed as separate component elements. Further, in this embodiment, although the whole body of the absorber is wrapped with the topsheet, the bottom surface part of the absorber may not be wrapped with the topsheet. In this case, the opposite side edges of the topsheet may be fixed to the backsheet at each side of the absorber.

The present invention will be more specifically described with reference to test examples.

[TEST EXAMPLE 1]

50 weight parts of a linear low density polyethylene resin (manufactured by Mitsui Petrochemical Industries, Ltd. under Item No. UZ25100J) having a resin density of  $0.925 \text{ g/m}^3$  and a melt index of 10 g/10 min, 50 weight parts of a low density polyethylene resin (manufactured by Mitsui Petrochemical Industries, Ltd. under Item No. M27) having a resin density of  $0.918 \text{ g/cm}^3$  and a melt index of 2.0 g/10 min, and 8.4 weight parts of  $\text{TiO}_2$  as an inorganic filler were agitated by a mixer, the resultant was extruded to form a film by a sheet molding machine, the film surface was then made rough by satin finish, and thereafter the film was embossed. As a result, a film of a basis weight of  $50 \text{ g/m}^2$  was obtained. The melt index shows an amount of extrusion of a resin having a load of 2.16 kg at  $90^\circ\text{C}$ , and the resin density was obtained by a density gradient tube with reference to ASTM D1505.

[TEST EXAMPLE 2]

100 weight parts of a linear low density polyethylene resin (manufactured by Mitsui Petrochemical Industries, Ltd. under Item No. UZ25100J) having a resin density of  $0.925 \text{ g/m}^3$  and a melt index of 10 g/10 min, and 8.4 weight parts of  $\text{TiO}_2$  as an inorganic filler were subjected

to the same procedure as in TEST EXAMPLE 1. As a result, a film of a basis weight of  $50 \text{ g/m}^2$  was obtained.

[TEST EXAMPLE 3]

100 weight parts of a low density polyethylene resin (manufactured by Mitsui Petrochemical Industries, Ltd. under Item No. C-2499) having a density of  $0.909 \text{ g/m}^3$  and a melt index of  $4.0 \text{ g/10 min}$ , and 8.4 weight parts of  $\text{TiO}_2$  as an inorganic filler were subjected to the same procedure as in TEST EXAMPLE 1. As a result, a film of a basis weight of  $50 \text{ g/m}^2$  was obtained.

[TEST EXAMPLE 4]

100 weight parts of an intermediate density polyethylene resin (manufactured by Mitsui Petrochemical Industries, Ltd. under Item No. NZ45200) having a resin density of  $0.945 \text{ g/m}^3$  and a melt index of  $20 \text{ g/10 min}$ , and 8.4 weight parts of  $\text{TiO}_2$  as an inorganic filler were subjected to the same procedure as in TEST EXAMPLE 1. As a result, a film of a basis weight of  $50 \text{ g/m}^2$  was obtained.

[TEST EXAMPLE 5]

50 weight parts of a linear low density polyethylene resin (manufactured by Mitsui Petrochemical Industries, Ltd. under Item No. UZ25100J) having a resin density of  $0.925 \text{ g/m}^3$  and a melt index of  $10 \text{ g/10 min}$ , 50 weight parts of a low density polyethylene resin (manufactured by Mitsui Petrochemical Industries, Ltd. under Item No. M27)

having a resin density of  $0.918 \text{ g/cm}^3$  and a melt index of 2.0 g/10 min, and 8.4 weight parts of  $\text{TiO}_2$  as an inorganic filler were subjected to the same procedure as in TEST EXAMPLE 1. As a result, a film of a basis weight of  $25 \text{ g/m}^2$  was obtained.

[TEST EXAMPLE 6]

The same detail as in TEST EXAMPLE 5 were subjected to the same procedure as in TEST EXAMPLE 1. As a result, a film of a basis weight of  $100 \text{ g/m}^2$  was obtained.

Backsheets and flaps were formed using the film produced by the various TEST EXAMPLES, and the sanitary napkins of Fig. 1 were prepared. Function evaluations were carried out with respect to the flaps. The results are shown in Table 1.

The function evaluations were made with respect to women who put on the sanitary napkins provided with flaps, these napkins being made from the various films obtained above, as follows;

Excellent as flap portions of a napkin	..... ©
Good as flap portions of a napkin	..... ○
Fair as flap portions of a napkin	..... △
(rather stiff or rather unreliable)	
Poor as flap portions of a napkin	..... X
(still or unreliable)	



[TABLE 1]

	Resin Density	Compounding Ratio	Basis Wt (g/m <sup>2</sup> )	Satisfaction as flap portions
	1 0.925	50	50	⊙
	0.918	50		
	2 0.925	100	50	○
Test Exam.	3 0.909	100	50	△
	4 0.945	100	50	X
	5 0.925	50	25	X
	0.918	50		
	6 0.925	50	100	△
	0.918	50		

As apparent from the results of Table 1, the sanitary napkins having the flaps formed from the films obtained in TEST EXAMPLES 1 and 2 satisfy the function as the flap portions of a sanitary napkin. Therefore, it is known

that in order to form the flap portions having an appropriate feel and outlook and a film strength, it is necessary to make limitations in range to the material as resin density being  $0.910 \text{ g/cm}^3$  to  $0.940 \text{ g/cm}^3$  and basis weight being  $30 \text{ g/m}^2$  to  $90 \text{ g/m}^2$  and the function as the flap portions can be satisfied if the various factors are within the range just mentioned.

Also, as apparent from Table 1, it is known that if the resin density of the material of a film forming the flap portions is less than  $0.910 \text{ g/cm}^3$  as in TEST EXAMPLES 3 and 4, the flaps are too soft or flexible and insufficient in strength, on the contrary, if it exceeds  $0.940 \text{ g/cm}^3$ , a feeling of stiffness is given, and in addition, even if the resin density is within the above range as in TEST EXAMPLES 5 and 6, if the basis weight is less than  $30 \text{ g/m}^2$ , the flaps become unreliable and insufficient in strength, and if it exceeds  $90 \text{ g/m}^2$ , the comfortability is lowered and the rigidity of the flaps is increased, and none of them can be satisfactory as the flap portions of a sanitary napkin.

## CLAIMS

1. A sanitary napkin having flaps extending from opposite side portions of a central absorbent portion, said central absorbent portion comprising a liquid impermeable backsheet, an absorber and a liquid permeable topsheet,

said flaps being composed of film having a basis weight of 30 to 90 g/m<sup>2</sup> which is composed of material having a resin density of 0.910 to 0.940 g/cm<sup>3</sup>.

2. A sanitary napkin as claimed in claim 1, in which said flaps are formed by extending said backsheet.

3. A sanitary napkin as claimed in claim 1 or 2, in which said flaps and said backsheet have embossed surfaces, respectively.

4. A sanitary napkin as claimed in claim 1, in which said flaps are composed of a mixture of two or more kinds of resin.

<b>Patents Act 1977</b> <b>Examiner's report to the Comptroller under Section 17</b> <b>(The Search report)</b>	18 Application number GB 9404746.1
<b>Relevant Technical Fields</b>  (i) UK Cl (Ed.M)      A5R (RPA, RPC, RPF, RPG) (ii) Int Cl (Ed.5)      A61F 13/15, 13/56, 13/58  <b>Databases (see below)</b> (i) UK Patent Office collections of GB, EP, WO and US patent specifications.  (ii) <b>ONLINE DATABASES: WPI</b>	Search Examiner L V THOMAS  Date of completion of Search 21 JUNE 1994  Documents considered relevant following a search in respect of Claims :- 1-4

**Categories of documents**

<b>X:</b> Document indicating lack of novelty or of inventive step.	<b>P:</b> Document published on or after the declared priority date but before the filing date of the present application.
<b>Y:</b> Document indicating lack of inventive step if combined with one or more other documents of the same category.	<b>E:</b> Patent document published on or after, but with priority date earlier than, the filing date of the present application.
<b>A:</b> Document indicating technological background and/or state of the art.	<b>&amp;:</b> Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
X	EP 0314535 A1 (KAYSENSBERG S A ) see lines 8-15 column 6	1
X	EP 0304644 A2 (PERSONAL PRODUCTS) see line 16 column 3 to line 16 column 4	1, 2, 4
X	EP 0249924 A1 (PERSONAL PRODUCTS) see line 34 page 11 to line 19 page 12	1, 2
X	WO 91/16873 A1 (PROCTER AND GAMBLE) see line 22 page 6 to line 2 page 7 and lines 20-29 page 10	1, 2
X	US 4608047 (MATTINGLY) see lines 28-56 column 5	1, 2

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).